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The Centenary of the birth of Dr. William Henry Welch, held April 15, 1950.

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Taken in 1882

courtesy of the Welch Library

Taken in 1884 after he returned to Germany to work with Dr. Robert Koch and after his appointment to the Johns Hopkins.

INTRODUCTORY REMARKS MADE AT THE AFTERNOON SESSION OF THE WELCH CENTENNIAL CELEBRATION*

DETLEV W. BRONK

President of the Johns Hopkins University

Twenty years ago our nation celebrated the eightieth birthday of the dean of American medicine. But as President Hoover said to that portly, genial gentleman who sat at his side in the city of Washington, William Henry Welch was more than our national dean—he was the greatest statesman of the world in the field of public health. It was, accordingly, fitting that the celebration should be transmitted to far distant nations where physicians listened in respect to their inspiring leader who had blazed new trails for medical progress. Nor were the audiences of physicians unattended by countless thousands of others who recognized in that great man a human benefactor.

In this month which is the one-hundredth anniversary of the birth of William Henry Welch in the Litchfield Hills of Connecticut, it is fitting we should again pay homage to the Welch of Hopkins. It is fitting that we should do so here in the center of his labors whence radiated his great genius.

It is characteristic of his breadth of mind and interests that no single discourse could encompass the significance of his labors. Accordingly, we have invited four friends and colleagues to speak of Dr. Welch's contributions to their respective fields of interest: pathology, public health, medical history and medical education.

*Held in Hurd Memorial Hall, Johns Hopkins Hospital, April 15, 1950

Path. Anat.

Lec. 1. (Sept. 22, 1882)

Gentlemen,

It has in former times been customary at the beginning of a course of lectures upon pathological anatomy to devote considerable time to a presentation of the importance of the subject and the necessity of its study. Instructive as such remarks might be, it is however true that the importance of pathological studies are at the present day too well understood and too generally admitted to make it necessary for me to devote any of the limited time at my disposal to general considerations of this character. I, therefore, need no apology for plunging at once into the middle of the subject.

It is proper for me to lay before you, in a word, the principal aims which I shall have in view in the following course of lectures upon pathological anatomy. I shall make the leading features of the course the demonstration of fresh pathological specimens and the making of post mortem examinations. In doing this I must sacrifice to a considerable extent systematic didactic instruction. I am governed by the fact that it is possible for you to learn from books the didactic parts, whereas nothing can replace the careful study of fresh specimens. Pathological histology is a subject which can only be learned by practical work with the microscope in a laboratory.

For your reading I would recommend the following text-books:

courtesy of Welch Library

First lecture notes dated September 22, 1882.

THE INFLUENCE OF WILLIAM HENRY WELCH UPON THE DEVELOPMENT OF PATHOLOGY

ERNEST W. GOODPASTURE

Professor of Pathology, Vanderbilt University, Nashville, Tennessee

As we commemorate today the centennial anniversary of Dr. Welch's birth his genial presence returns vividly to mind, and memory of his personality as a whole engages the thoughts of those of us who knew him. While we may thus contemplate his beneficent life in its totality I shall view him briefly as a pathologist. In attempting to describe some facets of his influence upon the development of pathology, I am reminded that the period of his birth coincided with the modern renaissance of the science of diseased processes. Contemporary pathology and William Henry Welch saw the light almost simultaneously and they grew up together, each significantly influencing the growth of the other. The energy of their growth and flowering has dominated medicine in the first half of this century and will never, we hope, be spent.

Although his activities were largely confined to the American scene Dr. Welch's leadership in pathology early received international recognition. His own investigations carried out mainly between 1885–1900 were of superior quality. Yet his greatest influence upon the science was perhaps that of a pioneer and leader who by virtue of his example, his sponsorship, interpretation and promotion, almost throughout the formative period of medical science, created a productive environment which brought pathology to the forefront of effectiveness in that unprecedented movement.

To set his influence upon the development of pathology in this country in proper perspective it would be well to recall the striking contrast between its low estate in America at the time of his return in 1878 from his first sojourn in Europe, and the fervid atmosphere in which the subject was cultivated in the German environment as he found it during his two enlightening and formative years in active laboratories abroad. Having only recently graduated from one of the best medical schools in the United States the comparison was only too vivid in his own mind. To undergraduate medical students of his

day gross specimens of pathological lesions from surgery and the "dead house" were to some extent available, but their histology and cellular structure were not disclosed to them. There was no real laboratory of pathology; and no laboratory course opened its revelations to eager minds. A course of lectures in pathology offered by Samuel D. Gross at Cincinnati in 1835, the first in this country, gave rise to the excellent textbook of this noted surgeon which was originally published in 1839. This together with a lesser Treatise on Pathological Anatomy by William Edmonds Horner which appeared ten years earlier, constituted the only native American textual material on this subject. Physiology as applied to solution of problems of disease was practically non-existent, while bacteriology and immunology, except for Jennerian vaccination, were, though gestating, as yet unborn. Of inspiration to experimental research upon the nature and causes of disease there was none.

It was the postgraduate educational enlightenment which Dr. Welch experienced as a student in Germany that laid the real foundation for his future influence. As an undergraduate medical student he had developed an interest in and an attachment to medicine that finally superseded his earlier penchant for Greek; but his scholarly taste and his intellectual bent were still unappeased and he longed to apply himself to the pursuit of learning in an academic setting where he might devote himself to search for fundamentals.

As an interne at Bellevue he came to know Dr. Abraham Jacobi, who directed his attention to the great movements and achievements of German medical science; and his professor of surgery, James R. Wood, urged him to spend a year there. The realization of that dream gave him great delight, though his ardor must have been for the moment dampened by his inability on arriving in Strassburg to enter von Recklinghausen's course in histo-pathology, because he was not prepared in normal microscopic structure. He soon found his way however to the physiological laboratory of Karl Ludwig which introduced him finally to the pursuit that appealed to him most, experimental research under Julius Cohnheim in Breslau.

In addition to learning and using in Cohnheim's laboratory the experimental methods of physiology applied to problems of disease Welch was there made aware also of the unfolding concept of the

specific microbial causation of infectious diseases. Robert Koch, from whom he was later to learn techniques of bacteriology not yet devised, had come to the laboratory a short time before to demonstrate the life history of the bacillus of anthrax. Carl Weigert was working there intently engaged in demonstrating bacteria by staining them for the first time. Young Salmonsen from Denmark in the same laboratory was studying experimental tuberculosis before Koch had discovered the specific bacillus.

In this atmosphere of German scientific activity, discovery and leadership, Welch, the ambitious young American student of 26, found the needed ferment to catalyze the full capacity of his unusual intellectual powers. Here he found men of world renown seriously and diligently devoting their lives to the study of the very fundamentals upon which future Medicine was to be built. Moreover they were cultured and highly respected men who were provided with laboratories and suitable equipment for their work. Strange enough, as it must have seemed to him, they were paid too while doing these exciting and important things so they could live without resort to medical practice or other diverting minor enterprises. Perhaps best of all students from the world over came to these investigators, and their laboratories were opened to them for instruction. As he himself could testify, new students might also under favorable circumstances engage in original research and publish the results too if such turned out satisfactorily as had his own. "We have nothing in America like these laboratory courses", he wrote home. "The idea of the German system of University Education is to furnish every facility for study, whether anybody makes use of it or not".[1]

In Germany he realized that new basic concepts of pathology had been acheived and others were in the making. Pathology, the science of diseased processes, was now on its way to constructing by means of the experimental method a broad and sound foundation for Medicine. He perceived that in the midst of this new environment he had found at last the real challenge he had been seeking. He had assessed himself in the balances of leaders and he felt prepared to meet the

[1] Flexner.

difficult realities that awaited him at home if he were to carry on the lighted torch.

In this frame of mind he returned to New York in 1878 and looked about him. With the joyous note of Cohnheim's laboratory still ringing in his ears, the contrast he faced seemed bleak indeed. "I was often asked in Germany" he remarked, "how it is that no scientific work in Medicine is done in this country, how it is that many good men who do well over there and show evident talent are never heard of and never do any good work when they come back here. The answer is that there is no opportunity for, no appreciation of, no demand for that kind of work here. In Germany on the other hand every encouragement is held out to young men with taste for science".[1] Despite this dreary outlook he had evidently determined to devote himself with all his power to the creation of a favorable environment for himself and for others like him who had a taste for the new pathology. He would work to provide the lacking opportunities, to instill a spirit of appreciation and eventually to stimulate a demand in America for the kind of pathology that he had learned to value.

It was, I think, of no little moment for his influence upon the development of pathology in the United States that he resisted the importunities of his family to return to Norfolk to inherit the Welch tradition of family practice and that he declined the more alluring invitation to associate himself, with the prospect of succeeding, the celebrated Austin Flint. Instead, by dint of perseverance and devious maneuverings he finally obtained a "laboratory", such as it was and some microscopes at Bellevue Hospital Medical College, and proceeded to conduct in the year of his return the first laboratory course in pathology ever offered in this country. Needless to say it was a success and his career as a teacher began.

During this period also he took occasion to spread the new pathology more widely to student and practitioner alike by contributing in 1881 the first seven chapters and rewriting the pathological descriptions of specific diseases in the Fifth Edition of Austin Flint's celebrated treatise on the Principles and Practice of Medicine. His contribution made the book to some extent a modern pathological text four years before that of Delafield and Prudden appeared.

After six years of single handed effort consecrated to his chosen

labors he was fortified in principles and objectives, matured in experience, toughened in endurance and well prepared to enter upon the next and vastly broader stage which the Chair of Pathology at Johns Hopkins afforded. Although he was not responsible for the new University environment conceived and brought to being at Johns Hopkins, the conception coincided completely with his own, and the old "Pathological" he created here possessed in high degree the favorable and inviting atmosphere that reflected the need of his own personality.

He now entered in earnest upon those activities that determined the full force of his influence upon the development of pathology. In as much as it was the first of its kind in America the organization of his laboratory is of interest, and was important in its effect upon pathology. It differed from the German institutes which were largely determined by special fields of activity representing essentially the line of research of each director. Dr. Welch incorporated in his department not only morphological pathology, gross and microscopic, but physiological or experimental pathology and bacteriology. In a second trip to Europe following his new appointment he had concentrated upon the newly devised techniques of Robert Koch, and with cultures of microorganisms obtained there he made the new science of bacteriology available to his students. The close association of bacteriology with pathology which he introduced established a pattern of considerable import to some of our American schools, institutes and hospitals.

He was convinced that the time had come for a fundamental rejuvenation of medicine through science. The refreshing activity which he had witnessed and participated in while in Germany must be transplanted in America. Investigators and teachers must be trained; research must be stimulated; new centers for study must be established and manned; students and leaders of medical practice must be prepared to receive and assimilate the new knowledge that was sure to come. Before the opening of Johns Hopkins Hospital and Medical School, advanced students had already presented themselves to the "Pathological" for instruction in the new methods, and Dr. Welch entered upon his most productive period of research.

Already as a student under Cohnheim, and following the line of interest in vascular pathology originally stimulated by Virchow, he had published his valuable work on acute pulmonary edema which, he discovered, could be induced experimentally by blocking the function of the left cardiac ventricle. He now was able on his own to pursue experimental investigations which resulted in numerous publications, some of the more notable being his studies of thrombosis in which he confirmed the important role played by the blood platelets in the formation of white thrombi. This was followed among others by studies of the relation of thrombosis to the passive congestion of heart failure, studies of experimental nephritis and an original description of the lesion of the glomerular tufts known as "intracapillary glomerulitis" which he named. In continuance of his interest in lesions of the vascular system he carried out with Mall a fundamental investigation of experimental hemorrhagic infarction of the intestines, in which it was discovered that the process of infarction resulted from a flow of blood into the area deprived of its normal circulation from the collateral circulation rather than by reflux from the veins. His essays on Thrombosis and Embolism contributed to Albutt's System of Medicine, and those on The General Pathology of Fever are classics on these subjects.

In bacteriology the contribution considered by Simon Flexner to be probably his greatest scientific achievement was the discovery of the *Bacillus aerogenes capsulatus or Clostridium welchii* as it is now called, which he studied with Nuttall. In his discussion of the subject with his students he used to express some doubt as to the honor of having a gas bacillus as a namesake, but this was at a time when there were many calls upon him for addresses.

Though not of such importance as the discovery of the gas bacillus, his early studies of hog cholera and other infections of swine served to emphasize the importance of comparative pathology. He urged the cultivation of this field for he fully realized its fundamental significance. The pneumococcus, recently discovered, was intensively studied in relation to lobar pneumonia. In association with Abbott he studied the bacteriology of diphtheria and they were the first in this country to confirm Loeffler's work on the specific bacillus, and he became the earliest authority on the clinical effects of diphtheria antitoxin. It was

a natural step to extend the influence of discoveries in these fields to the practical arena of preventive medicine and public health, and Dr. Welch used his influence to advance these developments.

As a pathologist Dr. Welch rarely essayed a general treatment of a somewhat abstract or speculative nature. One of his few publications of this sort dealt with the subject of Adaptation in Pathological Processes. His soundly rational and balanced consideration of basic physiological reactions to strains and injuries was masterful in its logical and lucid development of the subject. One is led to wish he had indulged more frequently in such thoughtful interpretations. As an investigator however he was not inclined to devote himself to a particular field of research. Rather his choice of problems was often contingent upon subjects that happened to focus his interest. His treatment however was always most thorough and authoritative.

At a time when there was little or no domestic literature available to keep the interested student abreast of current developments in special fields oriented in proper perspective, Dr. Welch's scientific papers were a most beneficial influence in the encouragement of research, and constituted models worthy of emulation in their mastery of the pertinent literature and judicious evaluation of it in relation to his own observations.

In his earlier days of scientific activity there was no American journal devoted especially to the field of pathology and many products of research were published in foreign periodicals. Dr. Welch's influence therefore in founding the Journal of Experimental Medicine was of the greatest significance, and his meticulous editorial supervision of it for its first several years of existence gave it the highest standing, international in scope.

In the midst of an ever increasing load of professional responsibilities, beginning with the opening of Johns Hopkins Hospital, then the Medical School, Dr. Welch lost no opportunity to use his great influence to liberate and extend the usefulness of pathology as the seat of medical science. Consulting and advising about appointments and recommending concerning reorganization or establishment of medical schools and hospitals, participating in the planning and organization of institutes of medical research, taking part in pathological

and other medical societies were all means he used to preach the gospel of pathology and scientific medicine.

Through public addresses and personal intercourse, rational always but gentle, persuasive, tactful, he persistently taught the lessons of medicine founded upon pathology in the broadest sense. In his writings one may perceive the lofty concept he held of the science which he came par excellence to represent. It was the true science of abnormal physiology coordinate with the sciences of anatomy, physiology and the basic sciences of chemistry, physics and biology which pathology should employ to the fullest advantage in the accomplishment of its aims. Although in Medicine the utilitarian aspect of pathology must necessarily be concerned with the solution of problems of disease, including those of diagnosis and therapy, it possesses in addition a broader and non-utilitarian significance for general biology. To appreciate fully the position of pathology among the sciences it should be viewed always in historical perspective; and the pattern he set for those who should seek it as a career was that of an intellectually cultivated man prepared to take a proper place in the university atmosphere of good taste, learning and inquiry.

To the end that this concept of his science should prevail Dr. Welch devoted the full measure of his professional life. In influencing the development of pathology the effect of his personality and his attainments as teacher, investigator, leader and statesman reached out to place its imprint upon the development of the whole of Medicine during the period of its greatest reformation in this country and the world.

Although their personalities and achievements were in many respects quite different interesting analogies might be drawn between the careers of Rudolph Virchow, the great pioneer of modern pathology and William Henry Welch, the sponsor of that pathology in America. Each cultivated and propagated this science in his own country and were its masters in their day; each attracted and developed a group of able disciples; each founded the first home for pathology in his respective environment, Virchow the Institute, Welch the laboratory department; each founded a Journal for his specialty and each was an eminent educator and medical statesman.

At a meeting in 1891 to celebrate the Seventieth Anniversary of

the birth of Professor Virchow Dr. Welch delivered an address on "Rudolph Virchow, Pathologist". In conclusion he quoted words of Virchow written forty years before, which I think are peculiarly applicable to Dr. Welch himself and I should like again in conclusion to repeat them:

"There are also those who, if they do not create the current, still give to it its direction and force. These men are not always the happiest. Many go down in the movement, or by it. Many grow weary after they have given to it their best forces. Much power and great tenacity are necessary if the individual shall not only live to see his triumph, but also to enjoy it".

Those of us who were privileged to know Dr. Welch and all who have felt his influence rejoice that he lived to enjoy his triumph, the triumph of the science of pathology that first gave to Medicine its sound foundations and set it on its fruitful way.

THE INFLUENCE OF DR. WILLIAM H. WELCH ON PUBLIC HEALTH

ALLEN W. FREEMAN

Professor Emeritus in Public Health Administration, The Johns Hopkins School of Hygiene and Public Health

The young scientist who came to Baltimore in the autumn of 1885 to become the first professor of pathology in this university looked forward with eagerness he said to the quiet and peace of life in a university laboratory. For that life he was prepared as were few other men of his time. Fifteen golden years of early manhood had been spent in readying himself for it. To accept the position here in Baltimore he had turned his back on a glittering opportunity for fame and fortune as teacher and fashionable practitioner of medicine in New York City.

In spite of his modest statement at the time of his appointment that he did not know how he came to be selected when there were others who had already established excellent reputations in the field, he must have felt himself well equipped for his task. His knowledge was even then tremendous in its volume and its scope. To its acquisition he had devoted all the time and energy which most men give to family and social life during the years between twenty and thirty-five. This great knowledge was ordered and correlated and his superb memory made it always available to him accurately and in detail. He had already demonstrated outstanding skill both as an investigator and as a teacher.

Of these facts the young professor cannot fail to have been conscious, but he possessed other attributes of which he was probably not so entirely aware. He had that great gift of personality which is conferred only on the most favored children of Fortune. The aura of force which surrounded him was as easily perceived as if it had been visible to the eye. He exercised that power over the minds and actions of other men which made him a leader always and in any company.

The young professor so generously endowed with all the elements of success, settled down to do research in bacteriology and pathology and to teach the little group of students who had come to him. It was not long however before he found exciting work to do outside his

laboratory. The medical school of the university was then in course of organization and to it he gave much of his energy and attention during these early years, but young Dr. Welch found time also for an occasional excursion into other fields, notably that of public health.

The medical profession of Baltimore seemed at that period to be completely unaware of the implications of the discoveries that were coming one so closely after another in the new field of bacteriology. This old city with its primitive system of waste disposal and its heavily polluted water supply suffered from a prevalence of typhoid fever which was excessively high even for an American city of the time. Its physicians were still debating as physicians had been doing since the time of Galen whether typhoid was due to a "contagium" or a "miasm" or possibly even to some combination of the two. To a young bacteriologist fresh from Munich where the intestinal diseases had been almost wholly eradicated by such simple means as a complete sewerage system and a good water supply, the situation in Baltimore was not to be endured. We find him therefore in April of 1887 delivering at the Annual Meeting of the Medical and Chirurgical Faculty of Maryland an historic address on *Modes of Infection*. This paper was moderate in its tone, but it was closely reasoned and completely convincing. It made crystal clear the fact that typhoid fever is the result of infection with a living organism and can be prevented by objective and practicable measures. So far as the records show this was the first venture of Dr. Welch into the field of applied bacteriology. Two years later in an address on *State Medicine* which was the name then applied to what we now call public health, he enlarged and extended the same theme. That time he spoke before the annual meeting of the American Medical Association and his audience was nation-wide.

Dr. Welch's next entry into the field of public health, however, resulted from work in his own laboratory. The isolation by Loeffler in 1884 of the organism causing diphtheria had still not been accepted as fact by the medical profession of the United States largely for the reason that Prudden, an old teacher and friend of Dr. Welch, had in 1889 studied a small series of cases of diphtheria in New York and had failed to find the organism Loeffler had described in a single one. In 1890–91 Welch with his assistant A.C. Abbott studied a long series

of cases in Baltimore and confirmed Loeffler's findings in every important particular. This was the first isolation of the diphtheria bacillus in America and the series of papers published by Welch and Abbott provided for the first time the basis for an intelligent attack on a disease which was at that time a highly important cause of death in infants and young children.

When certain citizens of Baltimore became alarmed at the backward sanitary situation of the city and organized a health association to campaign for better conditions, it was Dr. Welch who with Dr. Remsen, professor of chemistry in the university, guided the movement to final success and gave the city a complete system of sanitary sewers and an adequate and safe water supply.

In these activities and in the part he took in the battle to defeat anti-vivisection legislation by the Congress of the United States, Dr. Welch developed that amazing influence over the political figures of Baltimore, of Maryland and finally of the nation that he was to use to such great effect during the whole of the remainder of his life. He was never a crusader or a propagandist. His papers and addresses were always temperate and in good humor, but he presented his facts in such fashion that the conclusions to be drawn from them were inescapable.

In 1898 when a vacancy occurred in the office of president of the state board of health of Maryland, Dr. Welch was without question the one physician of all others to be appointed to the post. Under his leadership the work of the Maryland board developed soundly if slowly. During the period when Dr. John S. Fulton was its executive, Dr. Welch seemed to regard his duties as limited to securing the necessary support for Dr. Fulton's ideas. When the time came for Dr. Fulton to retire, however, it was Dr. Welch who planned and secured the enactment of legislation providing for the appointment of a director of health who was to be chairman of the board and the responsible executive of the department. Dr. Welch himself remained as a member of the board until the new plan was in successful operation and then quietly resigned.

To present a list of all the public health movements professional or popular in the organization or promotion of which Dr. Welch had a vital part would require far more time than is here available and it

need only be said that scarcely one major development can be mentioned in which he did not assist.

The Rockefeller Institute which has had so profound an effect on the development of basic research in the field of public health was established around Dr. Welch's fundamental conceptions and he guided its development through the critical early years.

When Dr. Charles W. Stiles persuaded Mr. Rockefeller to make his gift of a million dollars for the eradiction of hookworm disease Dr. Welch was the person whose advice to Wickcliffe Rose made effective the somewhat nebulous ideas which had inspired the gift.

The story of Dr. Welch's part in the establishment by the Rockefeller Foundation of a world-wide system of schools of public health is too well known to require retelling here. That the first such school was established in Baltimore and made a part of this university was a result of the confidence of the officers of the foundation in his wisdom and judgment. The institution was organized in accordance with his plan and staffed with men of his choosing.

In all his discussions regarding the school he insisted that the teaching and as well the practice of public health must grow out of and be subordinate to sound and fruitful research in the sciences basic to it. Without such research he said teaching becomes only the repetition of sterile doctrines. In the organization of the school he filled the professorships in the basic sciences before any appointments were made in the fields of practical application. The professorship of chemical hygiene was filled in 1917. That of public health administration not until 1923.

Tireless during the period of the design and establishment of the School of Hygiene, Dr. Welch left to the Assistant Director, Dr. W. H. Howell, full control over all matters of detailed operation. Scrupulously regular in his attendance on meetings of the advisory board of the school, he seldom attempted to influence the decision of minor or routine matters and was in fact not often seen about the building except when escorting a visitor or preparing for his weekly lecture. When any vital question was at stake however he exercised his authority as director fully and if need be ruthlessly. If an important position was to be filled he studied the field and chose the man best suited to the vacancy. His mind made up, he did whatever seemed

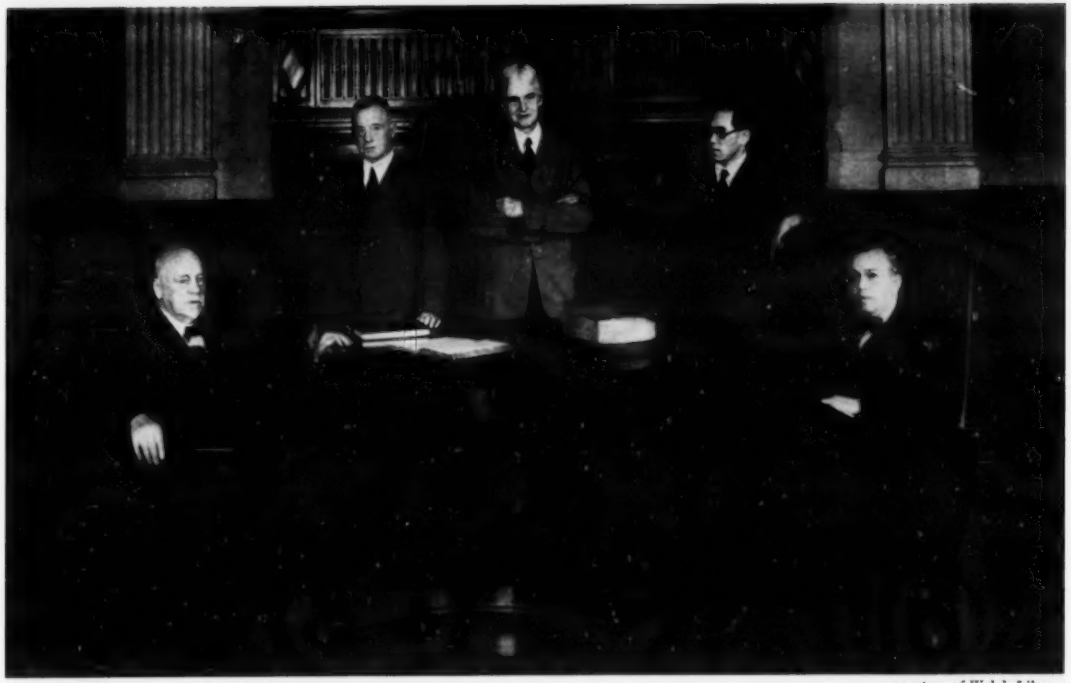
necessary to secure the appointment of his candidate. At such times of crisis he was to be seen about the school at all hours of the day going from office to office for personal interviews with those concerned. If the situation demanded correspondence he wrote scores of letters notwithstanding the fact that he abhorred dictation and penned most of his letters with his own hand. In emergency he even used the long-distance telephone, though like most of his generation he never became fully accustomed to negotiation at a distance. When the matter in hand had been settled he disappeared from view, usually from Baltimore, and let lesser men carry on thereafter.

Dr. Welch left to others the routine of systematic instruction and confined his own teaching to a single weekly lecture on what he called *Selected Topics in Hygiene.* In these lectures attended by students and faculty alike, the speaker ranged over the whole field of preventive medicine. Although he seemed never to choose the subject of his lecture until he started to the class room, his presentation was always orderly and logical and into it he poured all that knowledge of men and of events that his insatiable curiosity and his trained powers of observation had brought him in fifty years of work, reading and travel. No one who heard him could ever forget his demonstration of what a single mind could do in the acquisition, assimilation and orderly presentation of knowledge. No listener could fail to admire the man himself, his kindly tolerance, his sometimes excessive consideration for the feelings of others, his deep and genuine modesty and simplicity.

To one who was his pupil in the early days of the medical school, who served with him in the school of hygiene, who spent four shining months of European travel with him and who saw him frequently in his last illness, the memory that endures is that of a wise, upright, just, tolerant and above all a kindly man. Of his wisdom, uprightness, justness and tolerance all who knew him had ample evidence. Only those who knew him well could believe how kindly he really was. It was hard for him to say no to anyone who asked any favor, however preposterous, of him. Many thought him indolent because he left undone some of the things he had promised to do. A more probable explanation is that he could only with the greatest difficulty refuse any request made directly to him and thus often found that he had

promised to do something that he could not possibly do and that should in fact never have been asked of him. If he made himself inaccessible it was most frequently to prevent being asked to do something he knew he should not do but was afraid he could not refuse.

In public health as in other fields, the man William H. Welch was greater than the sum of his qualities and it has been the man himself rather than what he said or what he did that has had the most profound and lasting influence.



courtesy of Welch Library

Staff of Institute of the History of Medicine of the Johns Hopkins University from 1932 on, at which time Dr. Welch was Professor Emeritus. Left to right: Welch, Garrison, Oliver, Temkin and Sigerist.

DR. WELCH AND MEDICAL HISTORY*

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Dr. Welch accomplished so much in scientific and professional spheres that his work in medical history has naturally been viewed as tangential to his main career. One might therefore expect to find that his historical interests were of an incidental nature, but nothing could be further from the truth. All the evidence indicates that his delight in historical studies began with his college years and continued into his last days here at the Hopkins Hospital. Pushed aside for considerable periods by professional activities, this interest reasserted itself again and again; and his final appointment as professor of medical history was a more logical one than he himself—with his usual modesty—was willing to admit. It was logical not only in view of a long concern with the subject but also because Dr. Welch was an able medical historian in his own right. No American of his time displayed more insight into the development of certain aspects of modern medicine. It is extraordinary that this should have been the case with a man who, of necessity, gave the greater part of his years to non-historical activities.

Welch was first attracted to history as an undergraduate at Yale, where he aspired to become a professor of the classics. He subsequently studied in Germany under men who had some respect for historical backgrounds, but there is no record of any one teacher who inspired his enthusiasm. He attended Haeser's lectures on medical history at Breslau and found them "deadly dull"; but this experience did not discourage him. His interest in the past seems to have been self-sustaining, and he continued to read general historical works throughout his life. Upon becoming immersed in medicine, he brought to bear upon this field the historical perspective which was already essential to his whole outlook.

*This paper was also presented at the Twenty-third Annual Meeting of the American Association of the History of Medicine in Boston on May 21, 1950, and is being published in the Bulletin of the History of Medicine (July-August 1950), together with some other papers dedicated to the memory of Dr. Welch.

After Welch came to the Hopkins in 1885, he was too busy for several years to give much heed to medical history. Dr. Billings had urged a decade before that the subject be taught here, and did lecture on it himself for a short time. Under these circumstances, it is strange that Dr. Welch made no mention of the matter in outlining plans for the medical school in 1886. Two years later, however, he advocated in an address at Yale: "the study of the history of medicine, a subject which notwithstanding its interest and values is much neglected. Nothing," he went on, "is more liberalizing and conducive to medical culture than to follow the evolution of medical knowledge."[1] He thus anticipated, almost at the beginning of his Hopkins career, the program to which he would give all his energies some thirty years thereafter.

During the next year, 1889, Osler and Kelly joined the Hopkins group, and Welch found them kindred spirits in historical as well as other matters. Osler led in founding the Historical Club at the Hospital, of which Welch became the first president. At the initial meeting, the latter spoke on the value of historical studies to the physician; and thereafter he continued these talks to the Club year after year until he took over the direction of the School of Hygiene in 1918. In arousing the interest of his hearers, Welch had the advantage of his unique reputation and personality: whatever the master found of value, the students viewed with respect. It is improbable that any specialist in medical history, however able, could have elicited the same. Rufus Cole noted that the club meetings "exerted a deep and lasting influence on all the students and assistants. They stirred into life a new side of our personalities, the cultivation of which is important, even in those whose chief interest is science . . . "[2]

In a word, Welch breathed the spirit of the humanities into medicine—a living spirit, which animated current medical concepts and problems and which was never deadened by a mere curiosity about the past for its own sake. Although he spoke at first of cultural values, the historical approach to medicine became much more than this to him—it was a means by which the scientific navigator could take his bearings from the past and so chart his course into the future. He

[1] Simon Flexner and James Flexner, *William Henry Welch and the Heroic Age of American Medicine* (N. Y., Viking, 1941), 421.

[2] *Ibid.*, 422 f.

supported all his favorite programs, such as the need for integrating medicine with other sciences, by evidence drawn from past experience.[3] In his treatment, history was related to and threw light upon the present. It had, in an ultimate sense, utilitarian as well as cultural values. This outlook placed Welch in line with his own society which, as he himself noted, had always been utilitarian or pragmatic in its attitudes.[4] History was a serious business.

Between 1918 and 1925, Welch was absorbed in the development of the School of Hygiene. Upon reaching his seventy-fifth year on the latter date, he expressed a natural desire to retire; but his many friends had no intention of permitting this. Seeking some further opportunity for him and knowing his long interest in the subject, several of them conspired with Abraham Flexner to secure an endowed chair for him in medical history. Just because he took this field seriously, Welch was disturbed to learn of expectations that he would now "loll about" in the proposed chair during his "loafing years." He at first declined the suggestion, on the ground that to take it "at my age would merely emphasize the spirit of dilettantism in which the subject is regarded and generally pursued in this country." The very fact that Welch recognized this danger was, of course, the best evidence that he would not succumb to it. Convinced, finally, that the post would be offered to no one else, he accepted in 1926; and the General Education Board thereupon provided the necessary funds in connection with the endowment of the Medical Library.[5]

And so, at 76, Welch embarked upon his third major professional program with youthful enthusiasm. He decided at once that the professorship must be expanded into an institute in association with the library. Knowing German institutions well, his mind naturally turned to the famed Institute of Medical History at Leipzig as a model. Hence, just as he had gone to Germany for advanced medical training over fifty years before, he now returned there in 1927 for further light on his new profession.

His journals for this trip are replete with human details which make

[3] See his "Unity of the Medical Sciences," "Interdependence of Medicine and the Other Sciences of Nature," given in *Papers and Addresses*, III (Baltimore, Johns Hopkins Press, 1920) 315 ff.

[4] A Consideration of the Introduction of Surgical Anaesthesia," *ibid.*, 299.

[5] Flexners, *Welch*, 418.

interesting reading. Here was a man of almost eighty undertaking alone an arduous journey, on which he was not only to explore the possibilities of an institute but also to select and purchase $5,000 worth of books for the Medical Library. Yet Welch took it all as a matter of course. He had his little difficulties because of absent-mindedness; as when he forgot to declare at customs his beloved cigars, and the officials held up the boat train at Southampton because of their suspicions of this venerable smuggler.[6] In London he was much impressed by the Wellcome Historical Medical Museum, and its potentialities for the teaching of medical history. Arriving subsequently at Leipzig, he was much pleased by the Institute there. Dr. Sudhoff, the founder, and his successor, Dr. Sigerist, extended every hospitality; and Welch found them congenial and stimulating. In long talks with Sudhoff, he learned much about plans for a new institute at Berlin which was to pursue the history of the physical sciences as well as of medicine. He also pumped Sudhoff on the reputation of various German medical historians, and pondered the chances of persuading one or more of them to come to Baltimore.[7]

Meantime, he secured many suggestions concerning the book lists he was compiling. Sigerist had explained that he was interested in good editions and standard files rather than in first editions and rare books as such, and Welch agreed entirely with this attitude. Unlike Osler, he was not essentially a bibliophile; he wanted a working library. For several months in 1927 he bought nothing, discussing desirable purchases with Arnold Klebs at Nyon as well as with many others. In the fall, however, he arranged an extension of his leave; and after a vacation in Italy, began buying in earnest. Since he kept no systematic records of purchases, he was confused by his own lists and fearful of duplications; but he enjoyed the search for all that. He never knew just how much he had spent, and soon had exceeded the sum authorized; but noted that he would gladly go into his own pocket to make up any difference.[8] This whole time-consuming task was by no means the least of his services to the later Hopkins Institute and to the Welch Library.

[6] Diaries, 1927 (no. 24, "A"), 27 ff.
[7] *Ibid.*, 77 ff.
[8] *Ibid.*, no. 29, 91 ff.

The possibility of an Institute at Baltimore meanwhile hung in the balance. In Paris during the preceding summer, Welch had found both Flexner and Vincent encouraging about the prospects of an endowment; but further uncertainty ensued when there was a reorganization of the Rockefeller boards. Welch returned to New York in September, 1928, and in the following February made his first official address as the incumbent of the new chair. Upon his recommendation, Dr. Garrison was offered and accepted the librarianship of the Welch Library; and this best-known of American medical historians thus became potentially available for an institute staff. Welch also brought in as an assistant Dr. Stephen D'Irsay, whom he had met abroad during the preceding year. In October, 1929, the Welch Library and the Department of the History of Medicine were formally dedicated; and in May of the next year, the General Education Board extended an endowment for the Institute.

Welch had now achieved all that he had hoped for, and plunged into arrangements for organizing the Institute and developing its activities. Dr. John R. Oliver was added to the staff, and Dr. Charles Singer of London gave the first Noguchi lectures—a series endowed by Dr. Emanuel Libman of New York. Formal instruction began at the Institute during the fall of 1930, in its quarters on the upper floor of the Medical Library. Welch, Garrison, Oliver, and D'Irsay all offered courses; but few students attended and Welch confessed that the faculty was "rather overdoing it." Welch realized from the start that his energies were not adequate for the difficult task of carrying the Institute beyond its actual establishment. He therefore finally and irrevocably resigned on July 1, 1931, and the directorship was offered to Dr. Harvey Cushing and subsequently to Dr. Charles Singer of London. Both of these gentlemen eventually declined. In the fall of that year, the post was vacant. Dr. Sigerist was visiting lecturer at the time, and his success was so instantaneous that he was offered the directorship and accepted this in the spring of '32.

The subsequent history of the Institute is well known. It has remained a unique institution in this country and is one of many monuments to Dr. Welch's achievements. Although he constantly gave Osler credit for arousing interest in medical history at Hopkins, Welch alone envisaged the possibilities of an Institute devoted to the field.

And he alone—both because of his interests and his reputation—could have established it.

Welch, despite his broad grasp of medical history, felt some diffidence upon acquiring the status of a professional. When he attended an International Congress of Medical History at Leiden in 1927, he was welcomed with enthusiasm, but observed that he "had no right to claim admission to such a gathering of Fach-historiker." On another occasion he declared that he was "throwing off temporarily my disguise as a medical historian." He viewed himself as a beginner in his 70's. Although he enjoyed the thought that "for a budding historian, I have a running start," he declared that he would now have to go "to school again."

The Flexners, in their able biography, feel that in this respect Welch was simply adhering to his usual, realistic evaluation of his own work.[9] But modesty was also a characteristic of the man, and I really believe that here he under-estimated himself. Welch was an able medical historian long before he accepted a chair in the field. Judged objectively by published writings, his work stands out from that of most contemporary Americans in more than one respect.

In the first place, his interest was always in the broad sweep of scientific and professional trends, rather than in things curious or episodical. At the same time, he realized the significance of minor as well as of great figures; and the importance of basing general narratives on an understanding of local developments. In a word, he was at all times the historian as distinct from the antiquarian.[10]

Moreover, the same breadth of interest which transcended antiquarian details opened to him vistas of the larger relationships of medical to general history. In this regard, Welch was quite unusual among American contemporaries, most of whom wrote medical history in splendid isolation from its social and intellectual backgrounds. "I think," he declared, "there is scarcely any subject which, for the study of the history of medicine, does not possess significance; the history of medicine requires information on all the conditions of civilization of the particular period under consideration. How can one grasp its

[9] Flexners, *Welch*, 424.

[10] *Cf.* George Rosen, "Levels of Integration in Medical Historiography," *Jour. of the History of Medicine*, IV (Autumn, 1949), 460 ff.

real significance without knowing the state of contemporary knowledge of all departments of science and philosophy?"[11] In his actual writings, Welch gave chief attention to the interrelationships between medicine and the physical sciences; and took less heed of the impact of social forces upon medicine. But the larger concept was clearly there, nourished no doubt by his reading in general history.

This being the case, Welch decided that—as professor of medical history—he should establish contacts with both general historians and those devoted to the history of science. So far as I remember, no other American physician interested in medical history had made any such effort up to that time. Welch attended the annual meetings of the American Historical Association at Minneapolis in 1931, and I recall his sitting at the speaker's table on one occasion with unassuming dignity. He doubtless went out to see what he could learn from these professionals.

I suspect it never occurred to him that they in turn could have learned much from *him*. For most general historians had not—and have not yet—effectively incorporated the history of science into their synthetic narratives. There is, for example, hardly a college text in American history which provides any adequate notion of the role played by science in molding our present civilization. This should be of concern to scientists as well as to historians, for the public in consequence has little understanding of what science is all about. Welch was that rare person who knew both his science *and* his history; and had he been younger he might have done much to enlighten the general historians.

This observation may seem a bit sweeping, but I make it deliberately after a re-examination of his published papers. For Welch had a flair for getting at the essence of an historical trend, and then explaining it in a clear and incisive manner. He wrote well, as he spoke well, and always with apparent ease. It is true that he usually omitted the critical apparatus typical of contemporary historians—citations, bibliographies, and the like—because he wrote from a well-stocked memory and with the aid of reference and other general works which he had at hand. He rarely had time to dig into the original sources.

[11] Flexners, *Welch*, 435.

In this respect, he suggests the literary historians of the mid-nineteenth century; rather than the "scientific" historians of his own day.

Yet he was quite capable of operating in the most orthodox professional manner, as is illustrated by his address on the "Relation of Yale to Medicine." Because he found it difficult at first to see much relationship between Yale and medicine up to 1901, when the address was given, it seemed necessary in this case to consult the sources in detail. The result was an informative paper which is quite stimulating at times, as in its new evaluation of Nathan Smith; and one lays it down with a changed perspective on the Yale story. This was only one of many occasions in which Welch displayed an encyclopedic knowledge of men and events in American medicine—data which he always related, however, to meaningful trends and backgrounds. In any case, this particular essay was buttressed by such detailed notes and citations as would have warmed the heart of the most meticulous scholar.[12]

Welch stimulated his hearers with fluent summaries and interpretations, pointed usually toward their present implications. But he was also effective in analyzing issues and in raising critical questions. In the paper on "The Evolution of Modern Scientific Laboratories" he proposed a whole series of queries which needed further investigation.[13] One wishes that he could have conducted an historical seminar.

That he would have been sympathetic with graduate students, yet not uncritical withal, goes without saying. His kindly interest in younger men, and the affectionate esteem in which they held him, were proverbial. If chance had thrown him more into the way of historical students, he would certainly have been as stimulating to them as he was to junior medical men. I know whereof I speak for—if you will pardon a personal reference—Welch went out of his way to encourage my own interest in medical history at a time when such moral support made all the difference in a beginner's aspirations. One felt, after such encouragement, as if an accolade had been bestowed—and a devout wish to be worthy of it. The man who could thus inspire younger men had all the attributes of a great teacher.

What finer tribute can we render to Dr. Welch's memory, in con-

[12] "Relation of Yale to Medicine," *Papers and Addresses*, III, 243 ff.
[13] *Ibid.*, 200 f.

clusion, than to recall again the circumstances of his final contribution to medical history in this country? At an age well beyond that at which most leaders have retired, he applied to the planning of the Institute the wisdom of a half-century of scientific and professional achievement. In so doing, he raised the standards of the discipline in this country and provided it with an impetus to which it still responds. What would he not have accomplished, had he focused his interests on this field at a more youthful period—say, perhaps, when he was a mere stripling of 60?

DR. WELCH'S INFLUENCE ON MEDICAL EDUCATION

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Dr. Welch's influence on Medical Education could readily be shown by a list of his positions and accomplishments. But I take it that within the general theme of Dr. Welch's influence there will be room for surmise and speculation as well as demonstrable fact and direct inference. At any rate, I shall begin with the recital of some relationships, any one of which would deserve mention as an important influence on medical education. To this simple recital of facts I shall then add surmise, speculation and opinion in gradually increasing amounts in the hope of formulating a general concept that might indeed be applied to all of today's exercises.

As one of the earliest of his influences on medical education, Dr. Welch shared with President Gilman the task of finding and attracting to the new Faculty of Medicine of a young university these professors—Osler, Halsted, Mall, Abel, Howell and Hurd. Osler was forty at the time of his appointment, the others were all in their thirties, as was Welch. Gilman's performance, and Welch's share in it, was remarkable because it is harder to pick first-raters in their thirties than later when limitations as well as abilities have declared themselves. As I hope to point out later, Welch not only discerned the individual merits of these men: he accomplished still more because he brought them together and kept them together harmoniously at work.

Perhaps more personal and individual an influence on medical education is to be found in Dr. Welch's selection and training of a group of pupils. To the volume in honor of Dr. Welch's fiftieth birthday in 1900 there were 38 contributors. To read all their names would exhaust your patience without greatly deepening your conviction that the list of Dr. Welch's pupils could itself present a powerful argument for his influence on medical education—Councilman, Mall, Halsted, Barker, Abbott, McCallum, Flexner, Opie, Thayer, Nuttall, Howard, Carroll, Lazear, Walter Reed, Gorgas and in a later generation Whipple and Winternitz and Goodpasture. That is a list of men singularly influential in American medicine.

But to list only the men trained by Dr. Welch is to ignore a still larger number of young men who were placed in important positions entirely or partly because of Dr. Welch's recommendation. Of this group Dr. Rufus Cole, the physician placed in charge of the Hospital of the Rockefeller Institute, is a sample from what must be a long and significant array. And then, of course, there is the still larger roster of graduates of the Johns Hopkins Medical School and the students of the School of Public Health, who, if they heard even but once Dr. Welch at his best, remember the experience as one of the passages of excellence in a journey through a world of comparative mediocrity. Welch not only placed his well trained pupils: one of his greatest services was that he had much to do with creating the demand for their services by the reputation that grew up around what he was building in Baltimore for the medical sciences.

In still another capacity Welch was destined to serve medical education; namely, as the President of the Board of Scientific Directors of the Rockefeller Institute from 1901 to 1933 and as a Trustee from 1910 to 1933. During those years the role of the Rockefeller Institute as a source of trained medical scientists was extraordinary. For the very reason that it was successful in staffing many other centers, it could hardly be expected to continue just this form of leadership forever. Consequently, no one institution exists today with an equal distinction of current pioneering. American universities that had no long tradition of adding to knowledge were startled and at times exhilarated by the single-minded devotion of the Rockefeller Institute to research. Simon Flexner credits the Rockefeller Institute with having been a considerable factor in the creation of the Kaiser Wilhelm Gesellschaft. In that way one might claim Welch's indebtedness to German science was in generous measure paid, for Welch was Flexner's most far-sighted and influential adviser.

In an advisory capacity Welch served also the Carnegie Institution of Washington as a member of the Board from 1909 to 1934 and as Chairman of the Executive Committee for the first seven of those years, the Milbank Memorial Fund as Chairman of the Advisory Council from 1922 to 1932, the Rockefeller Sanitary Commission and its successor, the International Health Board of The Rockefeller Foundation, for 18 years, beginning in 1909. He was President of the

National Academy of Sciences from 1913 to 1916. It was during his presidency that the National Research Council was organized—certainly an event of profound influence on medical education as well as science generally. Besides these stipulated advisory services, Dr. Welch's advice was sought informally by Abraham Flexner, Wallace Buttrick and Frederick T. Gates of the General Education Board.

Out of his contact with officers of the Rockefeller Boards came Dr. Welch's membership on the Board of Trustees of the Peking Union Medical College which began in 1915 with a visit to Japan and China and continued till 1931. In the work of that medical school, staffed and equipped as no other medical school in the Far East, Welch's wide horizons in medicine were soon and long an influence for medical education of a superior range and quality.

Two further contributions to medical education were made by Dr. Welch when he was already at an age when few men undertake new enterprises. At 68 he witnessed the opening of the School of Public Health with a faculty selected by himself and Howell. The School opened with the same number of students—17—as had entered the first class of the Johns Hopkins Medical School 25 years before. Welch was its leader. He had planned or influenced the planning of probably every important aspect of its policy. In this enterprise, as in the Peking Union Medical College, Dr. Welch's influence went far beyond the United States. In large numbers the traveling fellows of The Rockefeller Foundation and other foreign visitors found in Professor William H. Welch an unforgettable Patriarch of World Medicine. They venerated him, and they carried back a vivid memory of him to all points of the world—or nearly all.

Then in 1930, after three years of preparation for a quite different enterprise, Dr. Welch had the satisfaction at the age of 80 of seeing his hope for an Institute for the History of Medicine assured, and two years later the appointment of Professor Sigerist dispelled any misgivings he might have had as to the life expectancy of this child of his old age. The older he grew, the more Welch got ahead of his contemporaries: not a common phenomenon. One has the impression that Dr. Welch was more deeply delighted by the success of this last institutional project than by almost any other undertaking he had laid his hand to. Perhaps this delight expressed the all-too-under-

standable impatience of an old man, or perhaps Welch's natural reserve in expressing his enthusiasms had diminished by the time he was 80. But I think the chance equally likely that Dr. Welch's extraordinary range of curiosity and erudition found in History the breadth and inexhaustible riches of the World and of the Past—dimensions and distances and a universal relatedness more satisfying to his mind than any one field of medicine had ever offered him. Besides, as we all near the status of the great majority, it is natural that their accomplishments fall into the far more mellow and tolerant perspectives of one about to join their number, even if not confident of their company.

Such, then, were the major directions in which Dr. Welch influenced medical education in what was to him as well as to his immediate juniors an almost unbelievably rewarding age in medicine. I have not mentioned some thirty-three other associations, mostly in the field of medicine, in which he was an officer or an active member. That these services were appreciated by his contemporaries seems clear from the number of honorary degrees, decorations and honorary memberships given him—forty-one honorary memberships, eighteen honorary degrees and twelve decorations and medals. The breadth of his interests and his erudition, and his skill as an adviser and negotiator made him more impressively effective among his contemporaries than he could later appear to anyone but a close student of his life and times.

These are facts—not all the facts—but some of the facts about the imprint of an evidently extraordinary man. Are there any circumstances which might help to explain more clearly the exceptional influence that this man exerted over his contemporaries, his juniors and even today their successors? I could name two such circumstances but I hope at no risk of being accused of trying to detract from the accomplishments of a great man. But his very impersonality in appraising others prompts a comparable response in this appraisal of his own influence.

It seems to me that we all owe a special debt first to the circumstance of Welch's remaining a bachelor, and second to the fact that he lived to attain a patriarchial status. By so much as the companionship of a wife would have shortened his time available for conver-

sation or reading at clubs, for travel, for work, for committee meetings and for study, her non existence has been the gain of his friends and medicine everywhere. Perhaps this is only the old argument for a celibate priesthood but I feel that Welch was far more effective and happy as a bachelor . . . and perhaps I should promptly rest my somewhat delicate case by noting that he seems to have had the same opinion. On the point of his living to the age of 84, there will be perhaps less difference of opinion. If you live until your devoted pupils and juniors have themselves become elder statesmen, you are almost assured of a legendary status while still alive: Welch became a living, genial legend. In civilizations as competitive as ours, old age, though not always honored, is usually respected if there be no signs of petulance, garrulousness, vanity or failing health. Instead of petulance Welch showed good-natured tactful generosity; though he liked to talk, it was always with a suave impersonality and from a well exercised and thus wonderfully rich memory; instead of vanity Welch showed a more modest estimate of his work than almost any man of his station in life; and his health and alertness of mind gave no cause for anything but admiring wonder even into the last year of his life.

It may be claimed, and plausibly enough, that Dr. Welch happened to live at a time in American history and in the development of medical science that would have made demigods out of mediocrities anyhow. That I do not believe: the only machinery for turning mediocrities into demigods is dictatorship, the ballot box or the law of primogeniture, and even such machinery needs the services of public relations experts to keep running smoothly. Admittedly, the growing wealth of America extended Dr. Welch's influence in directions and to distances that would otherwise not have been possible. And certainly the fundamental medical discoveries of 1880 to 1900 offered further research opportunities to persons who would have remained unknown if they had been born twenty years earlier. But neither of these factors explains the situation.

What explains more completely the magnitude and extent of Welch's influence on medical education is the remarkable combination of personal qualities he possessed. To match, and perhaps to protect him from, his hospitable generosity and general kindliness, he had an aloofness, a detachment and an impersonality that enabled him to be a

shrewd judge of men. He was able in his thirties to select a faculty with extraordinary discernment. Then came into play his remarkable ability as a conciliator. Inclined himself to take the middle path and follow the golden mean, he could mediate, buffer and persuade more naturally than utter ultimatums or mutter imprecations. In contentious matters he rarely took an extreme or irrevocable position. He must have had an unusual sense of timing and a keen conviction of its importance, for he would neglect everything for the sake of pushing some one matter at exactly the appropriate moment. And as a natural corollary of a good sense of timing, he had both patience and tenacity. To me his most impressive traits were, first, that he seemed to regard the faculty of memory as something calling for constant exercise and, second, that he assumed his companions to have the capacity to be interested in great themes and fine endeavor. With great natural dignity he elicited the interest of others by the high quality of his own curiosity, wonder and delight at knowing a subject thoroughly enough to be able to relate it to all manner of other aspects of living. Ingenuous himself, he drew out the best there was in others—the best. Hardly a more satisfactory combination of traits could have been found for the small collection of superior persons that was the Johns Hopkins of his day. I would repeat—the small collection of superior persons.

If I have made a convincing case for believing that Welch had a considerable influence on medical education, I owe some time to the task of describing in what directions this influence pointed. Remember that influence is not always triumphant—it sometimes meets defeat from opposition or apathy or unfavorable circumstance. None the less, it is influence and not without issue. In at least four directions Welch influenced medical education in this and other countries.

By conviction and by example Welch saw the tremendous gain it would be to medicine if travel, interchange and merit (regardless of point of origin) were to become characteristic of medical education and the criteria for promotion and praise. He opposed the parochialism and the clannishness that still smoulder in narrow minds in whatever washrooms they congregate. First a Connecticut Yankee, later a New Yorker, in going to Baltimore he went himself, as later he sent his pupils, to new environments—adventurously.

Welch exemplified as well as insisted upon the importance to medicine of science, of scientific methods, of scientific thinking and modes of expression. He championed the construction and the maximum use of laboratories and especially he worked for the creation of careers for young men who wanted to become full-time medical scientists. And he was a medical scientist when that was a suspicious sort of thing to be, with little but youth and logic to support its future. The significance of Welch's convictions is brought into sharp relief by Lester Carr's account of Professor Loomis standing on the platform lecturing to medical students in New York and saying derisively, "People say there are bacteria in the air, but I cannot see them,"—a witty remark in 1884 and greeted with a burst of applause from the students. Welch, who had just returned from Europe convinced of the truth of the germ theory, remarked when told of Loomis' witticism, "That's too bad. Loomis is such a nice man." In some ways this insistence on the importance of what we now call the medical sciences was Welch's most significant contribution to medical education. If so, it is because more evident success attended it than met two other of Welch's influences.

I refer, of course, to the fact that Welch's weight was in favor of treating students as though they were mature—as though they could wisely be given full liberty even though such an attitude seemed to the student like studied neglect. One could hardly prove that Welch was permanently successful in inducing maturity in the average American medical student, but I imagine that few of his pupils were unaware of the tonic value of this method of teaching—and there is even some evidence that they have practiced it on subsequent generations of students with memorable effects. It was, however, new in its time—"a voice crying in the wilderness" . . .

But the greatest influence that appears to me from the sum total of Welch's impact on medical education seems to have been his influence in recognizing the comprehensiveness of medicine, the fascinating interrelatedness of an almost unlimited number of ascertainable facts. It was the man's horizons as well as his adventuresomeness that were so startlingly grand, horizons that seem to have lifted apparently with every one of 83 years. To Dr. Welch, I believe, American Medicine owes, unconsciously, a peculiar debt—namely, a debt for being shown that the horizons of medicine *can* be almost

limitless. Dr. Welch had Vision—and would entertain a Vision with the hospitality and the patient alertness he would bestow upon a chosen guest at the Maryland Club. He *entertained* Visions. He had the wit to know that unless thus entertained, Visions slip out of town sedulously resolved never to return. Finicky things, Visions: high infant mortality, embarrassingly dependent on human beings, never seem to care who they visit, but *they never overstay their welcome.*

Let me begin the final section of this paper with a rather stark question. Can you think of some part of the world where there is a college or a university but where the establishment of a six-thousand-dollar fellowship without closely defined objective but tenable for six successive years would almost certainly be an inexcusable waste of money? If you can think of such a university, you will agree that there are, on the other hand, universities where such a fellowship would be magnificently used. What is the probable principal difference between a university that could not safely be given such a fellowship and another university that would be able to use so much money to the greatest advantage? I think it is that the first university lacks what I would call the heritage of excellence and the second has it.

I must admit that in the phrase "heritage of excellence" I am inventing a name for what I have sensed but never seen. I am sure it has been recognized, but has it ever been described? Though I believe it is a psychological reality, I shall introduce it as a hypothesis—as befits this audience.

I suggest that something extraordinarily precious comes out of the close but entirely free association of really superior people. To this emergent quality I give the name—the heritage of excellence, mostly because it lasts so long and because it never comes from, nor appeals to, mediocrities. I doubt if a human being can maintain really close relationships with more than six or seven people. Therefore large numbers of excellent persons are not necessary to create it. By really superior people I mean persons so spirited and yet so balanced, so gifted and yet so incomplete, so mature and yet so eager that they can remain in close contact with but a few of their kind and yet experience no surfeit, boredom or friction.

The exact nature of the contacts between a few absolutely first-rate people is completely unpredictable except in point of its astonishing quality. All you can know about it in advance is that it will be memo-

rable and that it will spread outward and afterward. This almost unearthly and certainly intangible product of the interchange between superior persons cannot be seen but it can be felt and truly like an atmosphere it can be breathed. Indeed, it is an inspiration.

Have you ever sat in with three or four really witty people who knew that to play ball you have to catch as well as pitch and that enchanted listening and attuned response invite and fully reward inspired talking? The result for you was almost certainly a memorable evening—an evening that transcends your abilities at description. That is a bit of what I mean by the heritage of excellence. But think of what this heritage of excellence would mean if applied not merely to wit but to the fields of friendship, of scholarship, of all medicine and of aspiration for the future.

What Welch and his colleagues did and believed and wrote is not as important now—nor anywhere near as important—as the heritage of excellence their contacts with each other have left us. We are met today to talk about Dr. Welch and his influence. What we are talking about is not Dr. Welch alone but the quality of interchange among a relatively small number of first-rate human beings—an atmosphere in which Dr. Welch was Popsy—a relationship whose larval form was eager work and whose imago I have tried to name as the heritage of excellence. It does not depend on numbers; it depends on the quality of the participants in the life of the university. Subjects may come and subjects may be removed from the curriculum; professors may turn out to have been egregiously mistaken, but if they were first-raters and in eagerly honest relationships with each other whether at work or at play, the result is the heritage of excellence.

In this sense Johns Hopkins is enviably rich. The legend, the heritage of excellence that came from the unflagging interchange between Welch and Osler and Halsted and Abel and Howell and Mall and a few others—in this you have what makes a generous fellowship a safe investment here at Hopkins, safer than in a university that has never witnessed the contagious companionship of excellence. What more do men of superior character and capacity require for their association than freedom, responsibility and expectation? The wisdom of the university is to provide those three—freedom, responsibility and expectation. It is the interaction of such men that attracts great young men, leads to great living and itself lives on long afterwards as a heritage of excellence ready at any time to burst into bloom again.

courtesy of Welch Library

On a trip to Ming Tombs in China in 1915

WILLIAM HENRY WELCH

ABRAHAM FLEXNER*

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I consider myself fortunate to have been asked to make the address commemorating the hundredth anniversary of Dr. Welch's birth. Not many human beings have led so useful, fruitful, and happy a life. There are those whose value is recognized only after their death. Not so Dr. Welch. During the last half century he has been adored this side of idolatry. But he smiled at the tributes paid to him during his life. On his eightieth birthday he sat at the side of President Hoover in Washington. He knew that simultaneously dinners in his honor were being given in London, Paris, Geneva, Tokyo, and Peking. Among the hills that surrounded the village where he was born, groups of those who had known him as a boy, recalling that he was given to baseball, sledding, and practical jokes, listened with rapt attention to the radio which transmitted the words of President Hoover and many distinguished friends and admirers, who recited his achievements as a scientist and as the greatest of reformers in the field of medical education and public health. How did the hero react to this adulation?

"Did I accept," he said, "merely as a personal tribute these words of praise and this manifestation of appreciation and good will marked by this large and distinguished gathering and by meetings elsewhere, I should be overpowered with a sense of unreality depriving me of utterance, but I shall assume, as I feel that I am justified in doing, that by virtue of certain pioneering work and through over a half-century of service I stand here to represent an army of teachers, investigators, pupils, associates, and colleagues, whose work and contributions during this period have advanced the science and art of medicine and public health to the eminent position which they now hold in this country. . . .

"If I have handed on any intellectual heritage to pupils, assistants,

*Address given at a dinner to commemorate the One Hundredth Anniversary of the Birth of William Henry Welch at the Sheraton Belvedere Hotel, April 15, 1950.

and associates, whose work and achievements have been the greatest satisfaction and joy of my life, it is derived from that which I received from my own masters. America is now paying the debt which she has owed so long to the Old World by her own active and fruitful participation in scientific discovery and the advancement of the science and art of medicine and sanitation. . . . It is perhaps not too much to claim that America has taken a position of leadership in the application of the new knowledge to the prevention of disease and to personal and public hygiene.

"But, my friends and hearers . . . so much more remains to be done than has been accomplished, the problems awaiting solution are so numerous and pressing, above all, the better utilization of existing knowledge and the need of more knowledge are so obvious and so urgent that our mental attitude should be far removed from satisfaction with existing conditions."

On his father's side, Welch was a descendant of a long line of physicians; his mother, however, was born in a log cabin. His parents were deeply religious; but their son, William, was slow to see the light. However, in 1865, he had mastered his doubts and joined the church. Ten or eleven years later, Welch abandoned his religious views. He wrote to his stepmother soon after arriving in Germany: "As no human power can change the inevitable succession of events in Nature, so we are made to be as we are by education, circumstances which surround us, and the evolution of causes over which we have no control."

In early manhood he was eager to become a teacher of Greek; as there was no opportunity to secure an attractive post, he reluctantly turned to medicine. He selected the College of Physicians and Surgeons in New York City. The school, like all the other medical schools at that time in the United States, was a poor one, but the teachers were fine gentlemen. Late in life, Welch declared that the "results were better than the system." Welch was, of course, a conscientious student. He was much impressed by Dr. Edward C. Seguin's course on nervous diseases. He thought at one time that he would devote his life to the study of neurology. But he made so admirable a report on Seguin's lectures that he won a microscope, which turned his attention away from neurology to the fields which he later cultivated. The microscope transformed for him the study of anatomy. From early

youth, Welch's interests were broad and varied. There were few subjects in which he was not well informed: literature, languages, history, art, music, politics, travel, food and drink—all were grist for his mill.

His passion for neurology now relegated to the rear, he became enthusiastic about pathological anatomy. He obtained a key to the excellent library of the New York Hospital, in which, as was his wont, he worked all hours—night as well as day. Soon he won a prize for an essay on goitre. At the end of his second year he had entered a cram quiz in surgery. Six months before graduation he received a Bellevue appointment in surgery. He tried to operate on a case of goitre. As to his performance, I quote a remark made in his old age, with a characteristic twinkle: "They decided never to let that happen again."

At Bellevue Welch made the acquaintance of Dr. Abraham Jacobi, who was greatly attracted to him. Jacobi occasionally invited Welch to dine at his home. It was Jacobi who first explained to Welch the great achievements of German scientists in the field of medicine and public health. In March, 1875, Welch wrote to his father that he wished to spend a year in Germany. The elder Welch did not react favorably. The son replied: "If by absorbing a little German lore I can get a little start of a few thousand rivals and thereby reduce my competition to a few hundred more or less, it is a good point to tally."

To quote his biographer: "Welch sailed on April 19th, 1876, on a voyage of exploration that was in its results perhaps the most important ever taken by an American doctor."

Welch's sensations on arriving at Strassburg on his first "voyage of exploration" are not easily described. I pondered for a few moments as I wrote the words "voyage of exploration". Suddenly there flashed into the vacuum of my mind Keat's sonnet,

On First Looking into Chapman's Homer

Then felt he like some watcher of the skies
When a new planet swims into his ken;
Or like stout Cortez when with eagle eyes
He stared at the Pacific—and all his men
Looked at each other with a mild surmise—
Silent, upon a peak in Darien.

Welch little dreamed that he would prove to be a great explorer. Strassburg was his first port of call. There he found Waldeyer, greatest of living anatomists, von Recklinghausen, Virchow's most brilliant pupil, and Hoppe-Seyler, who had for years worked with Liebig, the great master of chemistry. On his way to Leipzig he stopped in Munich. He reveled in its art galleries, its quaint old streets, and its opera. In Nürnberg he felt that he had stepped back many centuries. Arriving in Leipzig late in August, 1876, he was delighted by the University, oldest and largest in Germany. To his father he wrote gleefully: "If you could visit the handsome and thoroughly equipped physiological, anatomical, pathological and chemical laboratories and see professors whose fame is already world wide, with their corps of assistants and students hard at work, you would realize how by concentration of labor and devotion to study Germany has outstripped other countries in the science of medicine. There is much less feverish energy and haste and consequent friction, far more repose here than with us in all departments of life. Men do not grow old so soon."

Despite his scientific experience in Strassburg, he still nursed the interest in neurology inspired by Seguin. But fortunately, Johann Heubner, the great neurologist who had attracted Welch to Leipzig, had turned to pediatrics. Accordingly, Welch entered the physiological laboratory of Carl Ludwig—a step which determined his whole subsequent career.

On February 25, Welch reported: "My work with Prof. Ludwig has been very profitable, especially in giving me an insight into the apparatus and methods of modern physiology, which is by far the most exact of any of the branches of medicine, this position of exactness having been obtained more through the effort of Prof. Ludwig than of any living man. I hope I have learned from Prof. Ludwig's precept and practice that most important lesson for a microscopist, as well as for every man of science, not to be satisfied with loose thinking and half proofs, not to speculate and theorize but to observe closely and carefully facts."

Welch disliked many aspects of German social and political life; but he could not sufficiently praise their achievements in medical education and research. He had heard with interest of the founding of the Johns Hopkins University, and he thought it a good omen that Huxley had given the inaugural address.

One afternoon as he was working quietly in Wagner's laboratory, the professor came in with an American of stiff, military bearing; he introduced John Shaw Billings, librarian of the Surgeon General's Library, "who," Welch wrote his stepmother, "has been appointed to organize the hospital and medical department of the Johns Hopkins University and who is spending a short time in Germany for the purpose of studying the laboratories and methods." Welch accompanied him on a tour through the medical buildings and met him that night to drink beer at Auerbach's Keller. In the room where Faust was reputed to have met the devil, under sixteenth-century murals depicting this classic rendezvous, the two men, sitting unnoticed by the revelers around them, had an interview that was also to become classic, but in another world across the sea. No siren tale of power that the devil whispered into Faust's ear could have been sweeter than the tale Billings told; he said that the medical department of the Hopkins would not be organized for four years, which gave Welch time to prove himself. "There are to be laboratories like the German," Welch repeated to his stepmother, "and the examinations for admission are to be so severe as to exclude all except those who can appreciate and profit by the instruction given. The classes will therefore necessarily always be small, and it is hoped to attract especially graduates of other colleges, who now go to foreign countries. He said that many of the professorships would have to be filled by young men, who if necessary would be sent to Germany, as there were, for instance, no men in New York whom he would consider competent for the chair of physiology. Of course, such young men would at first be taken on trial and not made full professors."

Billings drew Welch out not only about his studies in Germany, although he inquired about these minutely, but also about his attitude toward science and life and many other things. Then he told Welch that he was directing his studies wisely and urged him to spend at least another year in Germany. "He took my name and address and said that he should have to look to such men as we, who were pursuing our studies over here." Although Welch did not ride out of Auerbach's Keller on a giant beer keg as Faust had done, and although it was a stiff military gentleman, not Mephistopheles, who left at his side, Faust could hardly have been more exhilarated than the young man whose dream might be coming true.

Years later Welch explained that he had expected to study with Virchow in Berlin, but Ludwig and his assistant, Kronecker, advised him to go to Breslau where Julius Cohnheim, a German Jew whose brilliant pioneering in the application of physiological methods to pathology had five years before secured him a professorship at Breslau, was at work.

After his arrival there in April, 1877, Welch explained to his father the difference between Virchowian pathology, as represented by his Leipzig professor Wagner, and Cohnheim's school: "Prof. Cohnheim and Prof. Wagner are in some respects the antipodes of each other. Wagner has perhaps a greater array of facts at his disposal . . . has gone deeper into the microscopic details of a pathological change, but while Wagner is often satisfied with the possession of a bare fact, Cohnheim's interest centres on the explanation of the fact. It is not enough for him to know that congestion of the kidney follows heart disease or that hypertrophy of the heart follows contraction of the kidney, or that atheroma occurs in old age, he is constantly inquiring why does it occur under these circumstances. The result is that Cohnheim has taken for his especial studies such common subjects as inflammation, dropsy, embolism and through his investigations these have become perhaps the only subjects in pathology in which our knowledge approaches in exactness what is known concerning a physical or chemical process.

"Pathology and even practical medicine have entered upon a new era since Cohnheim's discoveries in the process of inflammation for there is hardly a disease of which our conception is not thereby modified. He is almost the founder and certainly the chief representative of the so-called experimental or physiological school of pathology. That is, he occupies himself . . . with the study of the diseased processes induced artificially on animals."

Welch also became intimate with Carl Weigert, the pathologist who first stained bacteria, and the youthful Ehrlich. Near by was Heidenhain's physiological institute, where Welch listened to brilliant lectures on the physiology of the circulation. And, furthermore, the sky of Breslau was full of signs pointing to the new discovery that was to revolutionize pathology: the definitive proof of the germ origin

of disease and the accurate cultivation and identification of the causative bacteria.

On Cohnheim's advice he went to Prague to visit Klebs, who was studying acute endocarditis from the microbiological side, and Klebs showed him the bacteria in the ulcerative lesions of that disease.

Welch left Breslau October 26 for Vienna, with which he was disappointed; but there, as elsewhere, he was delighted with the opera and the art galleries, for despite his passion for science he, like Osler, was always a humanist. After brief visits to Strasbourg, Paris, and London, he sailed for America on February 6, 1878. He knew that he carried with him a knowledge of scientific medicine, the medicine of the future, the medicine that above all else America needed, but he also knew that America was not conscious of her need. Would he be forced to support himself by uncongenial tasks since no one wanted what he brought? That seemed very likely.

He began at once to seek a job. His former teacher, Dr. Francis Delafield, offered him an unpaid post as lecturer on pathology during the summer session, but Welch declined. In the hundred years of its existence, the college had never had a laboratory. Delafield next suggested that if Welch could find a room anywhere or equip it at his own expense, he might teach what and as he pleased. Thereupon he made application to the Bellevue Hospital Medical College; after months spent in negotiating with different professors, he received three rooms furnished with kitchen tables—*mirabile dictu*. Welch, surveying his empire, devoid of microscopes, instruments, and specimens, calculated rapidly that the school must have spent fully $25.00 for its equipment. For a while the outlook depressed him; but in 1927, looking backward, he remarked: "Few have been so fortunate in coming, provided with scientific wares from such sources as these (his foreign teachers), upon a scene so ripe for educational and scientific advance, and at a time so pregnant in the history of scientific medicine, and in finding opportunities so favorable, yes, even hungry for disposal of their wares."

Having somehow collected six antique microscopes, Welch put six students to work in May. Since the men, who were all beginners, were not ready to understand pathological specimens from the dead house,

he appealed to his sister to comb the marshes of upstate New York for frogs. It was a banner day when the boxes of damp grass arrived croaking with their live cargo, and a great disappointment when "a friend in Bridgeport", not knowing that frogs breathe air, sent ten large specimens in a bucket of water where they were drowned.

Welch's life in New York rapidly settled into the pattern which was hardly changed during his long life. He was a confirmed bachelor. Not until his fourth year was he permitted to lecture during the winter term. But he was not unhappy about this; all his life he knew how to wait. His students found him lucid, earnest, and convincing. He was too busy to indulge in the theatre, though he once saw Bernhardt and was fascinated by her. Several nights weekly he dined at the University Club. He wrote: "There is an excellent reading-room and library. All the latest magazines, books and papers are here. It makes a bachelor's existence quite tolerable to fall back after dinner into a large easy chair with a cigar and the latest Punch." Welch ate his lunch at some noisy restaurant near the medical school, usually by himself; although he put on no false dignity with his pupils, he did not encourage familiarity. He seems at times to have been so lonely that he regretted he was not married. "No tender hand," he complained to his sister in 1883, "ever puts my desk to rights."

Welch's associations with his fellow-physicians were pleasant if not very intimate. He knew his future Hopkins associate, William S. Halsted, well "in those days of his highest physical and mental vigor, and saw much of him. Halsted sent his students to take courses in histology and pathology in my laboratory. . . . He would collect tumors and other specimens from his practice which we would go over together at intervals of two or three weeks, and not infrequently I was a guest at the delightful little dinners where he and Dr. Thomas McBride gathered a few congenial friends at their home on East 25th Street."

Welch impressed his students with the "almost Spartan simplicity of his life." They felt he was dedicating himself to high ideals, searching intently for some great discovery. They did not know that this busy and superficially successful young man was really frustrated, since he lacked a chance to do what he longed to do. Would the time never come, he must have asked himself as he hurried from one me-

chanical job to another, when science would dawn over this changing city; would none of his colleagues ever see the vision, which he had seen in Germany, of laboratories filled with well-trained young men eager to push back the boundaries of knowledge? Sometimes his German experience must have seemed to him a mirage that had faded now to sober reality.

But his great opportunity was just around the corner. He had not forgotten Dr. Billings whom he had met in Wagner's laboratory. One day Dr. Billings, "happening" to be in New York, called at Welch's work room, and asked if he might see Dr. Welch do an autopsy next day. When the demonstration was over, Billings engaged Welch in conversation, drawing him out on what he would like to do if adequate facilities were placed at his disposal. The young man's face flushed, his eyes lighted, and he talked of laboratories as he had seen them in Germany, of original research done with his own hands. Billings remembered that Welch told him he had for a long time "been trying to make some original investigations in the causes and pathology of dysentery" but had lacked the time since he had been forced "to make his living by students' and doctors' fees." The visitor listened to all Welch had to say, asked some searching questions, and then took the train back to Washington.

On March 1, 1884, Billings wrote to President Gilman: "I saw Dr. Welch, had a long talk with him—heard him lecture—and saw him directing work in his laboratory. He is 33 years old, unmarried, of good personal address—modest, quiet, and a gentleman in every sense so far as I can judge. . . . He is a good teacher."

Welch learned later that many European scientists had been consulted, among them Cohnheim, who wrote Gilman in German as follows: "The person best fitted for the chair of general pathology is Mr. Welch of New York. Welch indeed worked with me for a long time and I regard him as an acute as well as a thoughtful investigator." On March 31, Welch accepted Gilman's offer, to be effective September 1, 1884.

On September 16, 1884, Welch again sailed for Germany, the second step in the great adventure that was destined to realize his dream. In Leipzig he wrote Gilman: "I am convinced that for some years the relation of micro-organisms to the causation of disease is to be

the most important subject in pathology. I have therefore endeavored to make myself thoroughly familiar with the present methods of investigation in this department, and I hope that we shall be in every way qualified to carry on bacteriological study successfully at the Johns Hopkins University."

During the years when Welch had been teaching students in New York, bacteriology had made great advances. Koch discovered the causes of Asiatic cholera, diphtheria, typhoid fever, tetanus, and other infectious diseases. When the opportunity to spend a year abroad came to him before entering on his new duties at Baltimore, Welch had fixed his heart on studying with Koch himself in Berlin, but as Koch's laboratory belonged to the War Department, Welch was advised to go to Munich where a pupil of Koch's, Wilhelm Frobenius, was at that moment concluding the first public course in bacteriology given anywhere in the world. Throughout his long life Welch was a wanderer into laboratories—a very welcome and inspiring one he was to become; his stay in Munich was no exception. There Welch worked in the famed hygienic laboratory of Max von Pettenkofer and discovered how methods of sanitary reform and purification of soil and water had almost abolished typhoid fever, once very prevalent in Munich; cases had to be imported to show the students, and in the hospital he saw under Hugo Wilhelm von Ziemssen a laboratory for the investigation of disease in the living patient that equalled the laboratories designed to study autopsies and other dead materials. After a few months he settled down once more to work in Leipzig with Ludwig and with Weigert, Cohnheim's brilliant assistant, who lectured on pathology after Cohnheim's death. Subsequently he returned to Ludwig's laboratory, because since Cohnheim's death he felt that he could profit more by work in physiological laboratories than in strictly pathological institutes. The following July he spent in Koch's new laboratory.

He took up his appointment in Baltimore on October 1, 1885, and started his work in three small rooms in Professor Martin's biological laboratory.

I first saw Dr. Welch very shortly after he came to Baltimore sixty-five years ago. I remember just when and where I saw him. President Gilman's offices were at that time in a building that fronted on Howard

Street. There was an entrance both from the front and from the rear, the latter a low doorway, leading into a small space which led into Little Ross Street, on the opposite side of which were the simple gymnasium and the tennis courts of those days. Dr. Welch was coming out of this small door, making his way to Little Ross Street. He was short and stout and did not, as I remember, differ much in appearance from his figure when I last saw him, though of course his hair and beard were brown. I had heard of him, however, when President Gilman on a previous occasion had informally announced that the Trustees had taken the first steps towards the formation of a medical school and faculty, which Mr. Hopkins had contemplated in his will, by appointing to the professorship of pathology Dr. William H. Welch, the favorite pupil of Cohnheim, the eminent pathologist of Breslau, but I snapped up eagerly every fact during those brief two years in Baltimore, and these items, so meaningless to me at the time, have clung to my memory ever since. I did not see Dr. Welch again until several years later when my brother, Simon, was working in his laboratory. On a few occasions while teaching in Louisville, I went East and visited my brother and once or twice met Dr. Welch, once, as I distinctly recall, in Dr. Welch's own room where he was sitting at a table looking through his microscope at some slides.

As early as June, 1885, Welch outlined to President Gilman his plans for beginning systematic instruction in the following year. He was to teach "pathological histology" in collaboration with Councilman: "demonstrations of gross pathological specimens" and "methods of post-mortem examinations" were to be given by Councilman alone; and he himself was to give "lectures on the general pathology of fever" and a course in bacteriology, concerning which he said: "So far as I know no similar course is given in this country and only three or four in Europe. . . . It may be mentioned that these courses embrace all which it is customary to give, even in German universities, in the department of pathology, and in fact all which are required for a thorough training in pathology."

My real intercourse with Welch began in 1908 when Dr. Pritchett for reasons that I shall never understand selected me to make a survey of medical education in the United States and Canada. After conferring with my brother, I went to Baltimore and had long conferences

with the members of the medical faculty there on a subject, of which I was in total ignorance. The two men, of whom I saw most and from whom I obtained most, were Dr. Welch and Professor Mall. They explained to me, in the first place, how the faculty of the Johns Hopkins Medical School had been brought together, the delay in its opening—for Dr. Welch was appointed in 1884, and the school was not opened until six or seven years later, after the hospital itself had been operating for several years, the conditions which had been attached through the influence of Miss Thomas of Bryn Mawr College to the gift which enabled the school to begin, and the way in which the laboratories were organized following the German model, the way in which the clinical teaching represented English influence, though not without certain features characteristic of French and German clinical teaching, and further what was most important of all—the fundamental difference between a medical school that was really an organic part of the university and the other American medical schools conducted by practising physicians. The rest of my study of medical education was little more than amplification of what I learned during my initial visit to Baltimore. I read assiduously the utterances of Dr. Welch. During the year and a half which was occupied in visiting medical schools I had frequent occasions to go to Baltimore for advice and guidance. It was Dr. Welch, Professor Mall, their associates, and my brother, Simon, who kept me in the middle of the road.

Welch was at that time (circa 1910) sixty years old, but he had the vigor, liveliness, and humor of youth. Graham Wallas once remarked: "The world improves through the making of new patterns." In planning the Johns Hopkins Medical School Welch had created a new pattern; it has been since adopted throughout the United States. Sixty though he was, he did not sit still. He continued from time to time to create or to innovate. Shortly after the publication of Bulletin Number Four Mr. Frederick T. Gates, Mr. John D. Rockefeller's adviser, asked me to lunch with him. The luncheon was simple and soon finished. Mr. Gates wasted no time on preliminaries. He said:

"I have read your 'Bulletin Number Four' from beginning to end. It is not only a criticism but a program."

"What would you do," asked Mr. Gates, "if you had a million

dollars with which to make a start in the work of reorganizing medical education?"

Without a moment's hesitation, I replied, "I should give it to Dr. Welch."

"Why?"

"With an endowment of four hundred thousand dollars," I answered, "Dr. Welch has created, in so far as it goes, the one ideal medical school in America. Think what he might do if he had a million more. Already the work Dr. Welch and his associates have done in Baltimore is having its effect in reorganizing the personnel of medical schools elsewhere, and we must not forget that but for the Johns Hopkins Medical School there would probably be no Rockefeller Institute for Medical Research in New York today."

Dr. Pritchett released me long enough to go to Baltimore to make a detailed study of the Johns Hopkins Medical School. Reaching Baltimore, I sought out Dr. Welch and explained to him that there was a possibility of obtaining a million dollars which might perhaps go in a lump to the Johns Hopkins Medical School for additional endowment and that I wished therefore to make a careful survey of the school and hospital and to get the judgment of the faculty as to the uses to which the income on this sum could be put. Dr. Welch was not excited at the prospect. He never became excited over possibilities, but he had been thinking, though without any hope or expectation, that this particular day might dawn. He said: "I should like to talk with you and Mall and Halsted at dinner tonight. Can you come to the Maryland Club?" After dinner he explained to his associates the hypothetical question which I had put to him. There was silence for a little while, then Dr. Mall spoke out:

"If," he said, "the school could get a sum of approximately a million dollars, in my judgment, there is only one thing that we ought to do with it—use every penny of its income for the purpose of placing upon a salary basis the heads and assistants in the leading clinical departments, doing for them what the school did for the underlying medical sciences when it was started. That is the great reform which needs now to be carried through."

The gift was called the William H. Welch Endowment for Clinical Education and Research.

Welch and Mall were the protagonists of full-time clinical teaching. When Dr. (Sir William) Osler heard of it, he protested vigorously, but Welch untroubled went his way. By 1913, Osler had changed his mind.

Essential to the development of Welch's laboratory and the school in general were adequate facilities for publication. As early as 1889, the Johns Hopkins Hospital Reports began to be issued. But these reports were inadequate. New and important material was rapidly accumulating not only in Baltimore, but elsewhere. Strangely enough, but understandably Volume II appeared in 1890; all sorts of difficulties, which I need not pause to explain, deferred the publication of Volume I until 1897. The name had been changed to Journal of Experimental Medicine in 1896; Dr. Welch, amidst his rapidly multiplying responsibilities, could not possibly continue as editor. Publication ceased in 1902. In 1904, it was taken over by the Rockefeller Institute for Medical Research and has been ever since open to the entire medical profession.

On his great voyage of exploration, Welch had, as I have already said, visited Pettenkofer's School of Hygiene. All his life, he never lost a chance to emphasize the importance of sanitation. He hoped to witness the creation in America of such an institute as Pettenkofer's. He urged whenever he found an opening the need of a clean water supply, adequate sewerage, Pasteurized milk, food inspection, a pure drug bill, a national association for the study and prevention of tuberculosis. It is impossible in a brief speech even to mention the various activities which justifiably called Welch away from his laboratory. No college or university president is under such pressure as Welch then was. Welch yielded with genuine reluctance. He could not escape the consequences of the success of the Johns Hopkins Medical School.

In 1910, Wickliffe Rose became head of the Rockefeller Sanitary Commission. Five years later, it became the International Health Commission, attached to the Rockefeller Foundation, Rose remaining its head. Not only hookworm but all infectious diseases anywhere became its province. Rose called for the creation of the School of Public Health. The Rockefeller Foundation provided the necessary funds. Welch prepared the plan, and its execution depended solely on Welch's acceptance of the directorship. Welch retired from his

professorship of pathology in 1917; on October 1, 1918, the School of Hygiene and Public Health opened with William H. Welch as director and William H. Howell, long a distinguished physiologist, as associate director. In 1921, the American Journal of Hygiene was started with Welch as editor. Thirty-six years previously Welch had after three weeks' cogitation accepted Gilman's invitation to come to Baltimore!

He was taking a cure at Carlsbad when the First World War crashed. He returned home September 7. He was at that time president of the National Academy of Sciences. Professor George E. Hale cabled Welch that the Academy was under strong obligation to offer its services to the President of the United States. How valuable were his services, I cannot pause to say. You will find a full—not too full—account in his biography.

In the summer of 1914, the Rockefeller Foundation undertook to promote modern medicine. Once more, Welch became the chief adviser. His interests in travel were never stated, but again, with this mere hint, I must refer you to his biography.

In October, 1924, after preliminary negotiations which need not be described here, Welch approached Dr. W. H. Wilmer, offering him a full-time professorship of ophthalmology, in what was to be called the Wilmer Institute of Ophthalmology of the Johns Hopkins Medical School. The Institute had procured adequate endowment mainly from the General Education Board.

On New Year's Day, 1925, Welch wrote: "It is more than time for me to resign from active academic duties. I shall be seventy-five in April." But neither his friends nor his colleagues thought his retirement either necessary or probable. There was still another institute that ought to be founded, and Welch was the only possible director. It was the Institute for the History of Medicine. On May 20, 1927—in his seventy-eighth year he sailed for Europe on another journey of exploration—a highly congenial one, for he was to buy books for the new library of the new institute. Once more after this mere mention, I must refer my audience to his biography.

In 1930, he went to San Marino, California, to spend a month in the Huntington Library. In October, 1931, he returned from Europe, at long last to enjoy his retirement, but the machine that had been geared high so long refused really to rest; hardly a day passed when

Popsy did not sally forth into the world. There were dinners to attend and dinners to give: he sometimes gave as many as three or four a month. "I suppose I am the only man here," he would say, "who remembers Cohnheim," and then the past would rise like a flood into his mind, and he would talk on and on.

In New York Welch spent his mornings in the library of the University Club—"a restful and delightful retreat"—and after lunch set out adventuring. Systematically the old gentleman visited every bathing beach accessible from the city, his portly form in his favorite one-piece bathing suit mingling happily with the crowds of the proletariat at places such as Coney Island, where he often spent the night. The children sticky with Eskimo pie or gleeful with little buckets, the sportive adolescents giggling and wrestling in the sand, the harried fathers of families trying to round up their squawking broods, all these amused him and filled him with a sense of life; the medical Brahmin had never enjoyed exclusive watering places. Undoubtedly the sideshows knew him, and who can tell what daring shoot-the-chutes thrilled the wastrel of eighty-two? He took long sunbaths on the beach, getting too sunburned as a matter of course, and he enjoyed bathing most when the surf was highest.

On a visit to Hartford, Connecticut, in December, 1932, he suddenly became ill. He returned to Baltimore immediately. On January 30, 1933, he gave his last dinner party. Two days later he entered the Johns Hopkins Hospital. He became gradually worse. He was completely unconscious for several hours before his death on April 30, 1934.

This brings me to the end of my impossible task. A life so crowded with incidents and achievement cannot be briefly sketched. A somewhat portentous volume is really required to do justice to the variety of Dr. Welch's activities, to his qualities as a human being, to the institutions and associations which he founded or headed, and what is perhaps more important than all—to a personality rich in every human quality.